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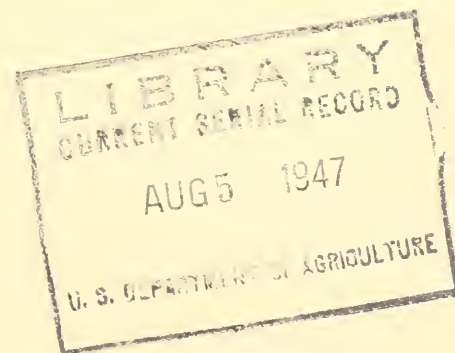


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P R O S P E C T U S

YEARBOOK OF AGRICULTURE 1948

G R A S S





YEARBOOK OF AGRICULTURE 1948

The members of the 1948 Yearbook Committee are:

M. A. McCall, Bureau of Plant Industry, Soils, and Agricultural Engineering  
Olaf S. Aamodt, Bureau of Plant Industry, Soils, and Agricultural Engineering  
P. V. Cardon, Agricultural Research Administration  
J. K. McClarren, Bureau of Plant Industry, Soils, and Agricultural Engineering  
C. E. Kellogg, Bureau of Plant Industry, Soils, and Agricultural Engineering  
W. R. Ellis, Bureau of Animal Industry  
R. E. Hodgson, Bureau of Dairy Industry  
R. B. Gray, Bureau of Plant Industry, Soils, and Agricultural Engineering  
R. J. Jordre, Production and Marketing Administration  
H. C. McPhee, Bureau of Animal Industry  
Walter C. Lowdermilk, Soil Conservation Service  
W. R. Chapline, Forest Service  
Carl P. Heisig, Bureau of Agricultural Economics

The Regional Chairmen are:

Northeast - Vance G. Sprague, U. S. Regional Pasture Research Laboratory, State College, Pa.

Great Lakes and Corn Belt Region - Henry Ahlgren, Madison, Wis.

South - Roy L. Lovvorn, Raleigh, N. C.

Northern Great Plains (to the Kansas-Nebraska line and west to the Rockies) George A. Rogler, Mandan, N. Dak.

Southern Great Plains - David A. Savage, Woodward, Okla.

Mountain Region (including the Rocky Mountains and their foothills) Raymond Price, Tucson, Ariz.

Pacific Region - (the area west of the Cascade and Sierra Nevada summit) Harry A. Schoth, Corvallis, Oreg.

Puerto Rico - Ray C. Roberts, Berkeley, Calif.

Hawaii - J. C. Ripperton, University of Hawaii, Honolulu

Alaska - C. S. Aamodt;

G. W. Gasser

Fred V. Grau (Specialized Uses of Grass)

\* \* \*

Alfred Stefferud, Editor  
United States Department of Agriculture  
Office of Information  
Room 534, Administration Building  
Washington 25, D. C.

## NOTES FOR WRITERS

1. The purpose of the 1948 Yearbook is to present a definitive, permanently authoritative, and useful study of grass and grassland agriculture.

We have a single subject: Grass as grass, its taxonomy, morphology, scology, history, place in agriculture, and uses. All segments of the subject fit into that unified framework. The tentative title, Grass, indicates the singleness of our theme, although our definition of grass includes legumes and other herbs used for forage, ground cover, and decorative and recreational purposes.

Our aim is to synthesize and instruct. That we issue such a book is a manifest of our conviction that grass and legumes are of inestimable importance to the Nation's agriculture, industry, and social stability; we do not preach or argue. In a truly scientific spirit we explain what we know about grass and, perhaps, indicate possible courses of action without advocating a particular action. We put the facts before our readers and leave them to make up their own minds.

The Yearbook reflects the highest ideals of accuracy and clarity. Simplicity in organization, presentation, and writing is a cardinal virtue, not because our readers cannot understand learned language but because simplicity is closely associated with clear thinking, mastery of subject matter, logical organization of thought, and competent workmanship.

2. The Yearbook will have three parts:

A. Data on grass that apply everywhere, nationally or internationally.

B. Data on grass that pertain specifically to the eight regions of the United States.

The approach is this: A farmer in Pottawattamie County, Iowa, gets from Section A a broad picture of the importance, values, uses, culture, and handling of grass; he finds in part 2 of Section B more specific information pertaining to his own area (if need be, to his own State and county) to learn which grasses to plant, details of adaptation he must observe, economic problems that might affect his own operations, problems of grass management and culture he will encounter; the influence of his particular soil, climate, type of agriculture, etc. This section is precise, practical, and as detailed as space permits. The goal here is like that of a textbook -- to answer every question, whether by text, charts, maps, or tables, that a farmer might ask about grass on his own farm.



10. C. In this section the most common and useful grasses will be identified as to name, origin, appearance, range of adaptation, most common diseases, nutritive qualities, uses, values and shortcomings, yields, use compared to that of another grass, etc. Each page will contain a quarter-page illustration to help the reader in identification, and about 500 words of explanatory text. A wealth of information is packed into short space.

Section A: 11 parts; 240,000 words; 480 pages

Section B: 8 parts; 160,000 words; 320 pages

Section C: 128 pages

Index, Contents, Foreword, etc. 32 pages

Pictures 96 pages

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3. The deadline for all articles is May 30, 1947. No manuscript can be considered after that date. The receipt of manuscripts by April 30, the date set in Committee Members' memoranda to contributors, will be appreciated.

All details of bureau and interbureau clearance and reading for technical accuracy are attended to before the manuscript is submitted to the editor.

Any problem of preliminary planning and scope will be handled through the respective Committee Member and Regional Chairman, but subsequent details of rewriting, presentation, and form will be handled directly by writer and editor.

Prospects are that shortages of paper, funds, stenographic help, and competent printers' proofreaders, which caused so many problems in the production of the 1943-1947 Yearbook, will continue. Contributors, therefore, are reminded of the imperative need to submit material and proofs on time, expedite retyping of manuscripts if they are asked to do so, observe word-limits, and remember that this book will comprise about 480,000 words (two or three times the size of the usual trade book) in 100-odd articles, all of which one person must read at least once.

This is a book of the Department of Agriculture. Mention of individual units of the Department is generally avoided, except where mention of a unit is needed to give the reader full information about a subject or to fulfill specific cooperative arrangements. We emphasize the subject, not the way in which knowledge about it was obtained.

#### 4. Mechanical Details.

Entries in the outline are topics, not titles of articles. Authors should make titles short, crisp, attractive, and precise. The editor will change titles to make them conform to the topographic style that is to be adopted. Long, involved titles repel the reader and -- just as important -- take considerable space in the table of contents, cross references, index, and first page itself.

Subheads are used to guide the reader in a long article composed of rather distinct parts. They are not properly used as a substitute for coherence and unity in writing or to reveal the mechanics of the author's outline. They are primarily a mechanical device and, when they are, are subject to being moved or omitted if makeup demands. A subhead may appear in galley proof but may not be kept in page proof if it causes an awkward break, say, between pages or in tabular matter. Good printing, not whim, determines such points. Subheads should be counted as 30 words each in the total word count. Only one kind of subhead is used -- one line, centered on the page. There should be no subheads in the first 30 lines of manuscript.

Footnotes should be avoided. If footnote material is important, it is incorporated in the text. If it is unimportant, it should be dropped.

Literature Citations should be grouped alphabetically by author's name at the end of the article under the heading, For Further Reading. (See Notes on the Preparation and Typing of Manuscripts.)

Provision will be made at the end of the articles for whatever acknowledgments the authors care to make -- to persons who helped in preparing the manuscript, sources of data, and cooperating persons and agencies.

Instead of identifying the author in a footnote on the first page, we continue the practice of the 1943-1947 Yearbook of printing, at the end of the article, the author's name, position, division, and bureau, with details of his professional career and experience. The intention is to get away from the too-terse Civil Service identification of a position and to let the reader know something of the writer's qualifications. Authors are invited to give full details about their work and experience; these will be shortened, if advisable.

Tabular matter is used, but tables should be clear, well set up, and meaningful. Authors usually find that the information often given in tables can better be conveyed in text. Text should not repeat material in tables.

Charts and line-drawings are welcome. They will be redrawn if necessary to make them uniform. Please do not submit old illustrations that have been frequently or widely used.

Contributors are encouraged to submit photographs (with fully explanatory captions) taken by professional photographers. Snapshots are generally unsatisfactory because -- for one reason -- too often they depend entirely on the caption to identify the subject.

The word count of articles includes subheads, tables, and charts, but not photographs.

Botanical authority will be omitted from scientific names. Scientific names (underscored and in parentheses after the common names) should be given, but whether they will be retained in all instances will be subject to later decision. We want to be clear, but to repeat the scientific name whenever the grass is named may be unnecessary and wasteful of space, especially if the plant is carefully identified when it is first mentioned. Section C, in any case, will provide a good, but not complete, check-list of varieties.



## 5. Writing

Yearbook articles should be written simply, clearly, tersely, and interestingly. We try to avoid the redundancy, cliches, and jargon that have become so common. We try to make every word count; we say, for example, "soon" instead of "in the near future."

The writing should reflect the personality of the writer. Ghosted articles or those that are extensively rewritten by somebody other than the author are not wanted.

We are not writing for fellow scientists or colleagues in the Department of Agriculture, but for a million American citizens who are alert, interested, and informed. We do not write for some imaginary group of sixth-graders, nor do we write to show off our command of 10-syllable words.

We do not subject manuscripts to a "readability" scale -- our ideals of good writing are above that device, which has limited usefulness when material is prepared for a well-defined group.

The booklet, The Publication of Research, copies of which can be obtained from the editor, contains a number of useful points on good writing.

Except when the need is clearly evident, long historical backgrounds are to be avoided in articles.

All technical or uncommon terms should be clearly defined at least once. Contributors should remember that many of the newer scientific words are not yet defined even in technical dictionaries.

Contributors should double-check most carefully proper nouns in their manuscripts and be certain that references to literature be complete and accurate. The editor has almost no facilities to do such checking.

6. Notes to typists appear at the end of this outline. Please see that they are carefully followed, although they sometimes deviate from standard practice. Attention to these details will save a tremendous amount of time and effort.

## CONDENSED OUTLINE

### Section A.

- I. Grass in a Permanent Agriculture
- II. Grasslands in the United States
- III. Grass and the Soil
- IV. Grass in the Conservation of Soil and Water
- V. Grass as Feed for Livestock
- VI. Management and Improvement of Ranges
- VII. Culture and Management of Grass on Farms
- VIII. Finding and Improving Grasses; Increasing Seed Supplies
- IX. Hazards of Growing Grass and Legumes
- X. Specialized Uses of Grass
- XI. Grass in the Agricultural Economy

### Section B. -- Regional Aspects

- I. Northeast
- II. Great Lakes and Corn Belt Region
- III. South
- IV. Northern Great Plains
- V. Southern Great Plains
- VI. Mountain Region
- VII. Pacific Region
- VIII. Alaska, Hawaii, Puerto Rico

### Section C. -- The Taxonomy of Grass

Text and Pictures

OUTLINE

SECTION A:

I. Grass in a Permanent Agriculture (M. A. McCall; P. V. Cardon)  
(10,000 words)

An introduction to the book. Suggested points: Importance of grass; why we consider the subject now; alternatives to grass; general mention of nonfarm uses; kinds, values, and uses of grass and legumes; definitions; original vegetation and subsequent developments; recent experiences with grass (farmers' experiences with grass, Dust Bowl, war); grass in the human environment (recreation, shelter, beauty, clothing); grass in a permanent agriculture; suggestions for a program -- or alternatives and elements of a program; problems of reconversion; national prosperity and grass.

This introduction gives background, the framework and purpose of the volume, and the importance of its subject.

Just as the purpose of this Yearbook is to tell all we know about grass and its uses, the purpose of this article is to draw together all the components of the subject in an interesting, orderly fashion. It is not a summary of the other articles.

II. Grasslands in the United States (Carl P. Heisig, Chairman)  
(20,000 words)

1. Inventory and Description (Webster Johnson; Hugh Wooten;  
C. P. Barnes) (8,000 words)

Present ownership, use, distribution, kinds; farm and natural grasslands; range; present condition. A series of maps will illustrate the points brought out.

2. History of Grasslands Settlement (Everett Edwards) (6,000 words)

Agriculture in grassland regions; development of such regions. Prosperity and grass. Migrations and grass. What's happened to grasslands.

3. Government Programs Pertaining to Grass (Neil Johnson; Charles Loomer) (6,000 words)

An historical survey, with some appraisal of the over-all values of the programs. Public land administration and policies.

Laws, activities, programs (State and national); agricultural conservation program; research activities; activities of the Indian Service; Grazing Service; Grazing Districts; FS; FMA; SCS and other units of the Department; TVA; Extension Service; FMA; ARA; etc. No attempt will be made to catalog activities of agencies that now do work involving grass, but a calendar of activities of agencies might be presented showing where farmers can write for information -- one-half page block, perhaps. As far as possible, the viewpoint in the paper is to present facts that will be useful 5, 10, 15 years from now, regardless of changes in agencies.



III. Grass and the Soil (Charles E. Kellogg, Chairman) (20,000 words)

1. Environment of Natural Grasslands (C. P. Barnes) (1,500 words)

This brief introductory article will include sketch maps of the United States and of the world showing the principal broad types of vegetation -- forest, shrub, and grass -- with emphasis upon the grasslands. Environmental factors determining the location of the grasslands will be discussed, including the effects of rocks and physiography at the margins. This environment will be contrasted with that of forest land, on the one hand, and of shrub land and other open land, on the other. It will serve as a broad background for the articles to follow.

2. Soil-Grass Relationships (Byron Shaw, leader) (7,500 words)

A group of three articles will elucidate the fundamental relationships between soil and the grass plants growing in the soil. The three authors should act as a committee and work closely together to develop their individual papers. There are three individual topics, and yet in each there is considerable overlapping with the others.

2a. Soil-Grass Relationships: Biological

This paper will deal with the micro-organisms in the soil and their influence in the accumulation of humus, the fixation of nitrogen, the decomposition of organic matter, and the development of granular structure. The unique biological conditions existing in grassland soils account for many of their unique characteristics.

2b. Soil-Grass Relationships: Physical

This article will deal with the pronounced effects of grass upon the physical properties of soil. The laying of soils down to grass is one of the best ways of improving structure -- of making the soil more mellow not only in the surface layers but also in the lower layers. These facts are basic to the consideration of water penetration, aeration, and soil stabilization against wind and water.

2c. Soil-Grass Relationships: Fertility

This paper will be built in part upon the other, but go more definitely into the matter of the effect of growing grass and its associated micro-organisms upon the fertility of soils for grass and other crop plants. Particular emphasis will be given to the effects upon organic matter and nitrogen.



3. Soil Development Under Natural Grass (James Thorp) (5,000 words)

This article will begin with the discussion of how grass stabilizes the landscape, and then slows down the vital geological processes of wind and rainwater. Even under grass there is further geological change through natural erosion and earth movements. As the grass grows it sets into motion processes of far-reaching importance in addition to the geomorphological and climatic processes. The highest development of soil under grassland is represented by the Chernozem. The process responsible for Chernozem will be discussed and its characteristics explained in relation to those of soils developed under forest, on the one hand, and those of the desert, on the other. The discussion should make clear the kind of environment in which grasses grow most luxuriantly under natural conditions. This knowledge will serve as a background for the following papers. The paper will be illustrated with examples from the American Great Plains, the Pacific Northwest, and the Prairie region of the western Corn Belt.

4. Soil Management for Establishing and Maintaining Grassland on Farms

It is intended here to present a group of papers dealing with the soil-management aspects of establishing and maintaining grasses on farms. Necessarily, general principles will be dealt with. Specific details will be covered in the regional articles.

4a. Natural Grassland Areas (Horace J. Harper) (2,500 words)

The concern here will be with pastures and meadows in areas of natural grassland through more intensive use of native grassland and the establishment of hays and meadows in rotations.

4b. Natural Forested Areas (Richard Bradfield) (3,500 words)

The soil problems involved in developing good pastures and hay meadows in areas not naturally adapted to grass will be discussed. Basic reasons for needing lime and fertilizers will be emphasized as well as the relationship of these crops to others in the rotation.

4c. Irrigated Desert Land (D. W. Thorne) (2,000 words)

A brief discussion will be presented of the soil problems that the irrigation farmer must meet in introducing grasses and legumes on soils that did not grow them naturally because of low rainfall.

IV. Grass in the Conservation of Soil and Water (W. C. Lowdermilk,  
Chairman) (20,000 words)

1. Grass and Legumes as Tools in Conservation of Soil and Water --  
An Introduction (W. C. Lowdermilk; F. J. Crider) (1,000 words)

Plant cover in the conservation of soils. Interdependence of soil and grass, and the soil conservationist's use of them. The effectiveness of growing plants and decaying herbage. The need for a variety of plants, each chosen to fill particular needs in the coordinated conservation farm and ranch plans.

2. Grasses and Legumes in Soil Conserving Rotations (R. Y. Bailey;  
W. M. Nixon) (3,500 words)

The need for ground cover to protect the soil from erosion by wind and water and to maintain it in a productive condition. Grasses and legumes grown in rotations with cultivated crops furnish protective ground cover. Kinds of ground cover, the extent of their use and patterns of arrangement in rotations are determined by the slope, soil type, and other characteristics of the land for which the rotations are planned. (Cf. 1943-1947 Yearbook.)

3. Domestication and Evaluation of Native and Introduced Plants for Conservation (A. L. Hafenrichter; A. D. Stoesz) (2,500 words)

How plants, grasses, and legumes were gathered and studied by plant scientists to find out their place in helping to conserve the Nation's soil and water resources. These materials were tested in gullies, on watersheds where floods had become common, on denuded rangelands, and on farms abandoned after wind storms had swept away the topsoil. Other grasses were tried in soil-building crop rotations, on terrace outlets, on diversion ditches, and on the earthworks that confined newly-built stock ponds. Domestication of native and introduced grasses and legumes required the combined and coordinated ingenuity of plant propagators, plant experts, and soil conservationists. In a dozen years many new and valuable plants have been put into production and are regularly used on farms. (Cf. VIII, 6)

4. Water Diversion in Conservation of Grasslands (R. V. Boyle;  
J. S. McCorkle) (2,500 words)

The article will explain how the volume, density, and regrowth of grass is increased by harnessing flood waters through spreading devices; how such water spreading restores original flood plain conditions and increases the area of grasslands through control of destructive gullies. The kinds of areas where the practice of water spreading is adapted will be described and structural precautions and the importance of State water laws indicated. (Cf. 1943-1947 Yearbook)

5. Grasses in Fixation of Dunes (Charles J. Whitfield; Robert L. Brown) (2,500 words)

Areas of unstable dune sand occur in the United States along the coast of the Atlantic and Pacific Oceans, the Gulf of Mexico, and the shores of the Great Lakes. Inland dune areas of recent origin occur throughout the Great Plains. Inland dune areas occur in other portions of the Western States and are common in small areas along the larger rivers in the Pacific Northwest. The effective control of unstable dunes by the application of scientific principles. The methods and materials used are described.

6. The Conservation of Grasslands and Stock Water Development (B. W. Allred; Howard Matson) (2,500 words)

Sufficient supplies of stock water contribute to even grazing of all areas without causing destructive overuse of vegetation surrounding watering places. Providing adequate supplies of stock water involves the development of ponds, wells, and springs at proper intervals to aid in the even distribution of livestock over the grasslands without undue cost to the operator. (Cf. 1943-1947 Yearbook)

7. Planning the Use of Grasslands for Conservation of Farms and Ranches (W. T. White; W. R. Frandsen; S. V. Jensen) (2,500 words)

How the farmer or rancher needs to do to make the most productive use of grassland areas; how to take stock of the total land resources of the farm; the capability of grassland and other kinds of agricultural cropland; how the farmer can appraise the soil, topography, and other physical conditions to determine which areas of the farm should be in grass; complementary and supplementary relationships involved when grassland farming is a part of the farm enterprise.

8. Pasture in Conservation Farm Planning (H. H. Gardner; J. P. Jones) (3,000 words)

Definition of pasture; kinds of pasture (to show specifically the kinds of pasture under consideration -- not to be confused with pastures in other parts of the country); establishment and maintenance (to show the difficulty and costs in order to place valuation); management of pastures; returns from pasture (in order to justify pasture as a land use in addition to an erosion-control practice); fitting the pasture into the conservation farm plan (actual planning of a farm, relationship of pasture land to cropland and woodland, pasture calendar, etc.) (Cf. IV, 7 and VIII, 6)



V. Grass as Feed for Livestock (W. R. Ellis; R. E. Hodgson, Chairmen)  
(40,000 words)

1. Value and Use of Grassland Crops for Livestock (W. R. Ellis;  
L. A. Moore; M. A. Hein) (3,500 words)

The importance of grass crops in livestock feeding; adaptability of livestock for utilizing grassland crops; evaluation of nutritive factors -- energy, carbohydrates, proteins, minerals, vitamins, digestibility; comparative composition and nutritive value of different grasses and legumes; comparative features of pastures, ranges, hays, and silage; grasses vs. legumes; etc.

2. Factors Affecting the Composition and Nutritive Values of Grassland Crops for Livestock (C. F. Huffman; L. A. Moore; W. R. Ellis) (3,500 words)

Soil; fertility; water supply; climatic factors; stage of maturity; deficiencies; toxic principles, etc.

3. Use of Pasture and Pasture Crops for Livestock Production (M. A. Hein; J. R. Dawson; D. A. Spencer; W. H. Black)  
(3,500 words)

Importance, use in different regions; types of pastures; development, treatment, and management; grazing capacity; methods of measurement; kinds of plants and plant associations; fertilization; etc.

4. Use of Pastures for Dairy Production (R. E. Wagner; J. B. Shepherd) (3,500 words)

All-season pasture, grazing management, pasture supplementation, etc.

5. Nutritional Value of Grassland Crops as Affected by Natural and Artificial Drying as a Means of Preserving Grassland Crops (R. E. Hodgson; R. E. Davis; T. E. Heinton; W. J. Hosterman)  
(3,500 words)

Hay, field curing, barn finishing; artificial dehydration, machinery, methods of field operation; storage; bailing; chopping; preparation for marketing; quality and quantity standards; etc.

6. Preserving Grassland Crops as Silage (J. B. Shepherd; R. E. Hodgson; W. R. Ellis; W. Ashby) (3,500 words)

Advantages; types of crop -- grasses vs. legumes; types of storage, different methods; preservatives; quality; uses; etc.

7. The Use of Harvested Forage by Dairy Cattle (L. A. Moore)  
(3,500 words)

Kinds; amount; values and importance in providing essential nutrients; as a means of providing protein; effects on milk production and value of milk; etc.

8. Utilization of Grassland Crops by Beef Cattle (W. H. Black;  
D. A. Savage) (5,500 words)

Including range pasture and harvested crops. Types of pasture; amounts, carrying capacity of range, means of providing essential proteins, minerals, and vitamins; finishing on grass; maximum use of forage for fattening; all-year management; range vs. pasture; etc.

9. Utilization of Grassland Crops by Sheep and Goats (D. A.  
Spencer; C. E. Holscher) (4,000 words)

Including range, pasture, and harvested crops. Types of pastures; amounts; carrying capacities of ranges; seasonal range use; means of providing essential proteins, minerals, and vitamins; supplementary feeding; range vs. pasture; etc.

10. Utilization of Grassland Crops by Swine (J. H. Zeller) (2,000 words)

Means of providing essential proteins, minerals, and vitamins; economy of gains; use of different types of pastures, hays, and silages; etc.

11. Utilization of Grassland Crops by Poultry (H. R. Bird) (2,000 words)

Means of providing essential proteins, minerals, and vitamins; use of pastures, kinds and management; use of silages; use of ground hays and leaf meals; effects of pasture, hay, and silage on egg production and quality; use of pasture in disease control; etc.

12. Utilization of Grassland Crops by Horses (I. P. Earle)  
(2,000 words)

Use of range, pasture, and harvested crops for maintenance, work, and growth; providing the essential nutrients; proportions of forage in the ration; etc.



VI. Management and Improvement of Ranges (W. R. Chapline, Chairman)  
(20,000 words)

1. How Range Forage Grows (William G. McGinnies; John L. Retzer)  
(2,750 words)

The practical aspects and fundamentals of the growth, physiological and ecological development of native range forage plants, singly and in association, including the relation of soil to this and the reaction to such basic ecological phenomena as succession, competition, etc. This article will lay the foundation in simple practical language for application of ecological principles in the other range articles.

2. Major Range Types (E. J. Woolfolk; D. F. Costello; B. W. Allred)  
(2,500 words)

This article aims to carry forward from the first and describe the major natural, forage producing types of the country, their location, general make-up, relative condition, and value for grazing, watershed, and other purposes.

3. Grazing Management of Range Lands (W. R. Chapline) (3,500 words)

The broad principles and practices relating to management of range lands including their relation to adaptability to various kinds of livestock, when to use the range, grazing capacity, systems of grazing, distribution and management of livestock, and supplemental feeding of livestock for yearlong maintenance.

4. Restoring Range Values Through Management (R. S. Campbell;  
L. E. Ellison; F. G. Renner) (3,500 words)

Since a great part of the range lands are not now producing what they are capable of, this article will bring out how by management such lands can be restored to greater productivity including such features as recognition of range condition, trends in range condition, and the whole aspect of natural revegetation under grazing use, especially the necessity for effective application of the principles and practices outlined above.

5. Range Improvement Through Reseeding (C. Kenneth Pearse; A. P. Plummer; D. A. Savage) (3,500 words)

The why of artificial reseedling, the kinds of sites suitable for reseedling, the more valuable species, varieties, and strains found adaptable for widespread use, how much seed to use, when to plant, and other features.

6. Coordination of Grazing with Forestry and Watershed Management  
(C. A. Connaughton) (3,250 words)

This will bring out the multiple uses and values of many range lands (exclusive of wildlife), the need for coordinating grazing with these other uses, and how this can be accomplished practically.

7. Relation of Wildlife to Range Management (L. W. Swift; Odell Julander; D. I. Rasmussen; Ed Graham) (3,000 words)

Deer, elk, and other big game animals and many types of small game and other wildlife utilize range lands. This article will bring out the values of such wildlife, the factors that must be taken into account in harmonizing grazing with such wildlife use and practical ways of accomplishing this. It will include forage for and environmental requirements of big game and native game birds, the role of rodents as competitors with game and livestock for forage and in relation to the biologic balance on range lands, and competition between livestock and game on range areas for certain kinds of forage.

8. Control of Noxious Plants on Range Lands (J. F. Pechanec; K. W. Parker; C. E. Fisher) (2,750 words)

The need for noxious plant control and the practical possibilities for removal from the range or reduction of such plants as sagebrush, mesquite, burroweed, and scrub oak by mechanical and chemical means or by burning and subsequent control through proper stocking and sound range management.

VII. Culture and Management of Grass on Farms (O. S. Aamodt; R. B. Gray)  
(23,000 words)

1. Nutritive Values of Different Kinds of Forages, Particularly as Affected by Fertilization Practices (J. T. Sullivan; H. L. Wilkins) (2,000 words)
2. Seed Production of Grasses and Legumes; Insect Pollination; Seed Harvesting and Cleaning (E. A. Hollowell; H. M. Tysdal) (3,000 words)
3. The Weed Problem in Relation to Grass Production, Including Mowing, Tillage, Chemicals, and Other Methods of Control (L. W. Kephart) (2,000 words)
4. Harvesting and Preservation of Hay, Silage, and Other Forages (R. B. Gray) (3,000 words)

The grass chopper, hay drier, mow finishing of hay, artificial dehydration, etc.

5. Soil Management of Grass in Crop Rotations, with Special Attention to Fertilizers, Top Dressing, Maintenance of Fertility, etc. (W. V. Bartholomew) (3,000 words)
6. Grazing Practices -- Deferred, Continuous, Year-Round, Practices, etc. (E. Marion Brown) (3,000 words)
7. Contribution of Livestock Manures to Improvement of Grassland  
(To be assigned) (3,000 words)

Kinds of manure, solid and liquid; amounts produced; fertilizing values; preserving and using solid and liquid manures on pastures and meadows; contribution made by droppings on range and pasture; effects on crop production, etc. (Cf. article in 1938 Yearbook)

(Unassigned) (4,000 words)

VIII. Finding and Improving Grasses; Increasing Seed Supplies

(O. S. Aamodt, Chairman) (20,000 words)

1. Breeding and Improvement of Grasses (D. C. Smith) (3,000 words)
2. Development of Improved Varieties of Alfalfa (H. M. Tysdal)  
(2,000 words)
3. Development of Improved Varieties of Clover (E. A. Hollowell)  
(2,000 words)
4. Pasture Legumes Other Than Alfalfa and Clover (Roland McKee)  
(2,000 words)
5. Selection of Strains of Grasses for the Range (Wesley Keller)  
(3,000 words)  
(Cf. IV, 3)
6. Exploration for Grasses and Legumes for Improving Pastures  
and Ranges in the United States (B. Y. Morrison; Carl O. Erlanson)  
(5,000 words) (Cf. IV, 3)

(Unassigned) (3,000 words)



IX. Hazards in Growing Grass and Legumes (O. S. Aamodt, Chairman)  
(20,000 words)

1. Rodents in Relation to Grass Production (E. R. Kalmbach)  
(5,000 words)
2. Insects in Relation to Grass Production (Clyde M. Packard)  
(5,000 words)
3. Diseases of Legumes (H. W. Johnson) (5,000 words)
4. Grass Diseases (J. Lewis Allison) (5,000 words)



X. Specialized Uses of Grass (Fred V. Grau, Chairman) (20,000 words)  
O. S. Aamodt

1. Recreational Uses (Fred V. Grau; George Harrington)
2. Parks, Lawns, and Cemeteries
3. Airports and Roadsides
4. Cover and Feed for Wildlife
5. Special Uses; Decorative and Aesthetic Aspects

(This section aims to give city people and others whose primary interest in grass involves grass in lawns, etc., a comprehensive, practical conspectus of how to grow grass under all common conditions and answer questions on fertilizer, lime, varieties, adaptation, mowing, etc. Summaries in chart and tabular form might be a useful, space-saving device.)

XI. Grass in the Agricultural Economy (Carl P. Heisig, Chairman)  
(20,000 words)

1. Long-time Outlook for Products of Grassland Agriculture  
(Reed Phillips) (4,500 words)

Consumption habits, influence of size of population and resources, prospective demand for livestock and livestock products, etc.

2. Place of Grass in Adjusting to a Balanced Agriculture  
(C. W. Crickman) (4,500 words)

Problems involved in shifting to grassland farming; the importance of crop utilization; value in the over-all organization and management of farms; stability; alternatives a farmer faces; labor efficiency; flexibility; grassland as a reserve; how farmers can take advantage of research in grass and legumes.

3. Marketing and Transportation Charges in Relation to Economic Utilization of Grassland (K. Bjorka; W. F. Finner) (3,000 words)
4. Costs and Efficiencies in Harvesting Forage Crops (M. R. Cooper; A. P. Brodell)  
(3,000 words)
5. Economic Implications of Increased Forage Production (O. V. Wells; Carl P. Heisig) (5,000 words  
or more)

Summary statement of the over-all implications; effects of more grass on production patterns (crops and livestock); significance to agricultural conservation; policy alternatives.

SECTION B  
(Olaf S. Aamodt, Chairman)

- Region 1. Northeast -- Chairman: Vance G. Sprague,  
U. S. Regional Pasture Research  
Laboratory, State College, Pa.
2. Great Lakes and Corn Belt Region -- Chairman:  
Henry Ahlgren,  
Madison, Wis.
3. South -- (including eastern Texas) Chairman:  
Roy L. Lovvorn,  
Raleigh, N. C.
4. Northern Great Plains -- (to the Kansas-Nebraska line and  
west to the Rockies) Chairman:  
George A. Rogler,  
Mandan, W. Dak.
5. Southern Great Plains -- Chairman:  
David A. Savage,  
Woodward, Okla.
6. Mountain Region -- (including the Rocky Mountains and their  
foothills -- westward through mountains,  
valleys, and plateaus to the Cascade and Sierra Nevada summit)  
Chairman: Raymond Price,  
Tucson, Ariz.
7. Pacific Region -- (the area west of the Cascade and Sierra  
Nevada summit) Chairman:  
Harry A. Schoth,  
Corvallis, Oreg.
8. Puerto Rico -- Ray C. Roberts,  
Berkeley, Calif.
- Hawaii -- J. C. Ripperton,  
University of Hawaii,  
Honolulu
- Alaska -- O. S. Aamodt  
G. W. Gasser

(Section B, Continued)

A suggested outline for the treatment of such material under each region:

1. Introduction -- General Statement

Definition of region; climatic and physiographic aspects; area; livestock numbers, classes, and values; social and economic conditions; use of grass in livestock production; integration of range, pasture, harvested feeds, etc.

2. Pastures

Place in regional economy; establishment (methods and species), soil management (fertilizers); maintenance and management.

3. Meadows

Soil management; establishment; harvesting and preservation.

4. Forage Production and the Farm Enterprise

Place in regional economy; establishment; soil management; harvesting, handling, and feeding. Economic aspects of forage production and land use; utilization of forage as feed for livestock; farmers' experiences with grass; pasture and forage crop problems. Conclusions.

5. Range Management (in regions concerned)

Major types; their value for grazing; prevailing range practices and problems; possibilities for improvement in practices; range reseeding, need, possibilities, and recommended procedures.

6. Conservation Problems of the Region; Recommended Measures and Practices; Soil Erosion; Fertility Aspects; Land Use

(If advisable: Research on Grass in Progress in Institutions of the Region)

(Committee Members and others interested in the specific problems of the different regions are invited to submit to the Regional Chairmen material that may be of value. The decision as to the use of the material is up to the Regional Chairman. Also, the Regional Chairmen might want to ask individuals for signed articles or material to be incorporated, with or without credit, as the Chairman decides, into the regional discussions.)



## SECTION C

The Common Grasses, Legumes, and other Herbs Used for Forage, Ground Cover, and Decorative and Recreational Purposes.

(Mason Hein, Chairman; Max M. Hoover, W. A. Dayton, Roland McKee)

This section will deal with the morphology of important grasses, legumes, and other grass plants, their vegetative organs, root, stem, leaf, flower organs, classification, and nomenclature. The section will be treated in five phases:

1. A general introduction giving the number of grasses, legumes, and other plants found to be useful for forage purposes either cultivated or on the native range. Following this will be a general discussion on the classification as to sub-families, genera, and species, and identification of the Gramineae and Leguminosae families. Drawings showing the various vegetative parts of typical grass and legume species. A brief statement on botanical and common names will be included.

2. The more important grasses and legumes are to be described and discussed by genera or species. A tentative list is appended. The treatment is by genera, with information as to origin, range of adaptation, nutritive value, etc., thus covering a number of species within a genus. In this way space could be conserved and still permit a better coverage of varieties of forage plants. As an example: The Agropyrons would be presented under one general heading of wheat grass with a discussion of the more important species. Photographs of one or two species would be used to give the reader a knowledge of the general type. In some of the legumes the illustrations may possibly be flower and seed characters only to show variation.

3. Weedy Plants. The species in this part would be confined to those plants that are considered weeds either in cultivation or in native pastures. The discussion would be along the lines of 2 but more brief. These species would be covered in 2 above.

4. Poisonous and Injurious Plants. This would follow the same general pattern as 3.

5. Shrub and Browse Plants. This also would follow the same general pattern as 3.

(A complete cross-index will make the foregoing information easily available.)



*Agropyron cristatum*; *Agropyron inerme*; *Agropyron intermedium*; *Agropyron smithii*; *Agropyron trachycaulum*; *Agrostis alba*; *Agrostis exarata*; *Agrostis palustris* (creeping bent); *Agrostis tenuis* (Colonial bent); *Alopecurus pratensis* (meadow foxtail); *Ammophila arenaria* (European beachgrass); *Andropogon furcatus* (Big bluestem); *Andropogon scoparius* (Little bluestem); *Aristida longiseta*; *Arrhenatherum elatius* (Tall oatgrass); *Arundinaria tecta*; *Axonopus affinis*.

*Bouteloua curtipendula*; *Bouteloua gracilis*; *Bromus catharticus*; *Bromus carinatus*; *Bromus inermis*; *Bromus marginatus*; *Buchloe dactyloides*.

*Calamagrostis canadensis*; *Chloris gayana*; *Cynodon dactylon*.

*Dactylis glomerata*; *Deschampsia caespitosa*.

*Elymus canadensis*; *Elymus condensatus*; *Elymus glaucus*; *Eragrostis trichodes*; *Eremochloa ophiuroides*.

*Festuca elatior*; *Festuca idahoensis*; *Festuca rubra*.

*Hilaria belangeri*.

*Koeleria cristata*.

*Lolium multiflorum*; *Lolium perenne*.

*Muhlenbergia montana*.

*Oryzopsis hymenoides*.

*Panicum virgatum*; *Paspalum dilatatum*; *Paspalum notatum* (Bahia grass) *Pennisetum glaucum*; *Pennisetum purpureum*; *Phalaris arundinacea* (Reed canarygrass); *Phalaris tuberosa* var. *stenoptera* (Harding grass); *Phelum pratense*; *Poa ampla*; *Poa arachnifera*; *Poa compressa*; *Poa fendleriana*; *Poa pratensis*; *Poa secunda*; *Poa trivialis*.

*Setaria italica*; *Sorghum halepense*; *Sorghum vulgare*; *Sorghum vulgare* var. *sudanense*; *Sporobolus airoides*; *Sporobolus cryptandrus*; *Stenotaphrum secundatum*; *Stipa comata*; *Stipa viridula*.

*Trisetum spicatum*.

*Arachis hypogae*; *Alysicarpus vaginalis*; *Lathyrus hirsutus*; *Lespedeza cuneata*; *Lespedeza striata*; *Lespedeza stipulacea*; *Lotus corniculatus*; *Medicago arabica*; *Medicago hispida*; *Medicago sativa*; *Melilotus alba*; *Melilotus officinalis*; *Pisum arvense*; *Pueraria thunbergiana*; *Sojo max*; *Stizolobium deeringianum*; *Trifolium repens*; *Trifolium pratense*; *Trifolium hybridum*; *Trifolium incarnatum*; *Trifolium resupinatum*; *Trifolium dubium*; *Vicia villosa*; *Vicia sativa*; *Vicia atropurpureum*; *Vigna sinensis*.

Text-picture sections. (J. K. McClarren, Chairman) (96 pages)

The details of this presentation are still to be worked out. It may include picture-stories, with liberal text, having to do with experiences of farmers and communities with grass, equipment for growing and harvesting grass, "before-and-after" material, etc. The intention will be primarily to supplement text material.

## NOTES ON THE PREPARATION AND TYPING OF MANUSCRIPTS

The Style Manual of the Government Printing Office governs capitalization, compounding, spelling, abbreviations, numerals, punctuation, and syllabification.

The first page of the manuscript should contain the title, in caps and lower case, flush on the left, and, directly below it, the name of the writer, as he wants it to appear in print.

On the last page, under the heading The Author (or The Authors) should be given the name of the writer, his full, official title and organization, and whatever details he cares to submit on his professional career, attainments, and work.

The original and the first carbon copy should be submitted to the editor.

All material should be double spaced; single-spacing is not permitted anywhere.

Do not break a paragraph at the end of a page. This does not mean one paragraph to a page -- several paragraphs may be put on the same page so long as the last one does not run over.

Pages should not be stapled together -- please use a paper clip.

Margins should be set so that lines average 66 characters and spaces.

Footnotes, if any, should be inserted immediately following the line in which the reference occurs, divided from the text by rules. We try, however, to avoid footnotes.

Figure legends should be written on separate pages. We try to make charts and tables self-contained and thus avoid, whenever possible, the often unnecessary "(see Fig. 3)" in the text.

Tables should be on separate pages.

Underscoring a word indicates italics and should be used infrequently and advisedly. Titles of books are underscored.

Only one grade of heading should be used -- center, caps and lower case, not underscored. Count three lines, or 30 words, for each subhead. Other types of headings will be inserted as needed in the editor's office.

Citations to literature should be grouped alphabetically by author's name at the end of the article. We deviate from the usual bibliographical practices in order to make the citations completely clear to the non-scientific reader. We do not follow an earlier practice of referring to literature by numbers in parenthesis in the text of an article; rather, where advisable in the text, we name the source and give the title of the book. We avoid meaningless abbreviations in the citations. These citations should be checked carefully with the publication itself as to the author's name, full title of publication, full name of publisher, year, pages referred to, and so on. Do not guess at any of these details.



(Sample of top of first page)

Beef Cattle and Grass (not more than 23 units)

by D. A. Savage

The beef cattle industry in the Southern Great Plains can be placed and maintained on a much more stable basis by improving the (etc.)

(paragraph is indented 5 spaces; lines average 66 units)

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(Sample of end of article)

have given fair success in range reseeding include blue grama, side-oats grama, switchgrass, and Indian grass.

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The Author

D. A. Savage, a native of Montana and a graduate of Montana State College, has been engaged in research on grass since 1924. Dr. Savage, principal agronomist in the Bureau of Plant Industry, Soils, and Agricultural Engineering, is stationed in Woodward, Okla.

Acknowledgments

R. B. Jones, of the University of Oklahoma, furnished the tables on reseeding and phosphorus levels (etc.).

For Further Reading (i.e., references to literature)

Savage, D. A.: Grass Culture and Range Improvement in the Central and Southern Great Plains, Journal of Engineering Chemistry, volume 92, No. 7, pages 5-102, 1946.





